

**PRICING TECHNOLOGIES UNDER MEDICARE:
METHODOLOGICAL OPTIONS AND SELECTION CRITERIA
(A BACKGROUND PAPER)**

Final Report

August 1989



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Prepared under Cooperative Agreement No. 99-C-99168/3-01
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CONTENTS

	<u>Page</u>
ABSTRACT.....	iii
SECTION 1. INTRODUCTION	
1.1 Purpose and Organizational of Paper.....	1-1
1.2 General Pricing Issues.....	1-1
SECTION 2. METHODOLOGICAL OPTIONS FOR PRICING TECHNOLOGIES	
2.1 Introduction.....	2-1
2.2 Accounting Report Analysis.....	2-3
2.3 Microcosting.....	2-8
2.4 Statistical Cost Analysis.....	2-12
2.5 Negotiation.....	2-14
2.6 Competitive Bidding.....	2-20
2.7 Expert Panels.....	2-23
SECTION 3. CRITERIA FOR IDENTIFYING TECHNOLOGIES FOR REPRICING	
3.1 HCFA's Role in Identifying Pricing Problems...	3-1
3.2 General Criteria for Selecting Technologies for Pricing.....	3-4
SECTION 4. CONCLUSIONS AND NEXT STEPS	
4.1 Rationale for Intervention.....	4-1
4.2 Costs of Identifying Technologies.....	4-1
4.3 Costs of Pricing Technologies.....	4-2
4.4 Next Steps.....	4-4
REFERENCES.....	R-1

Abstract

PRICING TECHNOLOGIES UNDER MEDICARE:

METHODOLOGICAL OPTIONS AND SELECTION CRITERIA

This background paper is the second step in a project whose goal is to select and apply an appropriate set of methodologies to price new technologies and reprice existing technologies covered under Medicare. This paper presents an overview of possible pricing methodologies and discusses criteria that could be used to select relevant procedures for assessment.

Section 2 defines six alternative, but not mutually exclusive, pricing methods, and discusses their advantages and disadvantages for particular types of technologies. These methodologies include three methodologies centered on costs--microcosting, statistical cost analysis, and accounting report analysis--and three methodologies which attempt to incorporate value and other factors in addition to costs--competitive bidding, negotiation, and expert panels.

Section 3 enumerates 11 criteria that could be used in selecting technologies for pricing using these methodologies. In general the criteria are indicators of potential price distortion or factors that indicate the potential for significant cost savings.

Section 4, the conclusion, presents a synthesis of the information, delineating the respective roles that the selection criteria and the methodologies would play in the pricing process. It is argued that the feasibility of this type of intervention rests on (1) the costs of identifying technologies where adjustments would be appropriate, (2) the costs of determining the appropriate adjustments, and (3) the benefits of making the adjustments. Finally, the next steps in the project involved in selecting technologies for application of these pricing methods are outlined.

SECTION 1

INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF PAPER

This paper is the second step in a project whose goal is to select and apply an appropriate set of methodologies to price new technologies and reprice existing technologies covered under Medicare. In so doing, the project will test the feasibility and effectiveness of applying particular pricing methodologies to certain types of technologies.

The first step in the project was the preparation of a background paper (Garrison, Wojcik, and McLaughlin; 1989) that described: 1) current Medicare pricing methods, 2) how these methods treat new technologies, 3) whether and to what extent pricing adjustments for old technologies are made as they diffuse further, and 4) the organizational processes used to make these adjustments.

This second background paper presents an overview of possible pricing methodologies and discusses criteria that could be used to select relevant procedures for assessment. Section 2 defines six alternative, but not mutually exclusive, pricing methods, and discusses their advantages and disadvantages for particular types of technologies. Section 3 enumerates 11 criteria that could be used in selecting technologies for pricing using these methodologies.

1.2 GENERAL PRICING ISSUES

In raising the issue of pricing or repricing technologies or other goods, the question naturally arises, why interfere? What is the problem that needs to be corrected? Generally, economists prefer to let markets determine prices and are, therefore,

opposed to fixing prices through administered pricing systems. In well-functioning markets, prices serve two major roles: they help to ration existing supply, and they provide a signal as to the value that consumers place on a good as evidenced by their willingness to pay. In the long run in such markets, it is expected that price will approach long-run minimum average cost (which is also equal to long-run marginal cost) if there is free entry of suppliers into the market. This result is sometimes used to argue that if administered pricing must be used, it should try to approximate this. Hence, an analysis of long-run production costs is often chosen as the basis for setting the administered price at minimum average cost.

At a higher level of complexity, economists have also argued that once there are substantial price distortions in a market (so that prices differ substantially from average costs from some goods), it may no longer be appropriate to use this pricing rule as a guide. A simple example--thinking of bread and butter as complements--illustrates the intuitive basis for this. Suppose the suppliers of bread colluded, set the price far above long-run average cost, and were able to earn excess profits. One result would be that some consumers would go without bread. Assuming that the bread consumption decision depends on both the price of bread and the price of butter, a policymaker could argue with some justification to lower the price of butter (perhaps through a subsidy) in order to achieve the socially appropriate level of bread and butter consumption. Without endorsing this particular intervention (other interventions, such as fixing the price of bread, might be possible), this illustrates one rationale for intervention via administered pricing systems.

There is widespread belief that medical care markets are far from well-functioning markets and are, in fact, rife with distortions due to the presence of insurance and other subsidies. A good case can be made that additional distortions arise from

the inflexible administered pricing systems in use, such as the Medicare prospective payment system for inpatient care and the system of payment limits applied to physician services.

In our previous background paper, we argued that Medicare's pricing system is a complex and fragmented system administered in a decentralized fashion, and as a result, its application is not uniform across the country or across providers. This project is examining one aspect of this system--the pricing and repricing of technologies. The question is, given the inevitable distortions that arise in such a complex, administered pricing system, are there approaches to making further adjustments that would lessen the distortions and, thereby, provide better incentives to providers and beneficiaries? The feasibility of this rests on (1) the costs of identifying technologies where adjustments would be appropriate, (2) the costs of determining the appropriate adjustments, and (3) the benefits of making the adjustments.

SECTION 2

METHODOLOGICAL OPTIONS FOR PRICING TECHNOLOGIES

2.1 INTRODUCTION

Our earlier background paper described the variety of methods HCFA uses to establish prices for technologies. For Part A services, the prospective payment system (PPS) for inpatient hospital services covers the lion's share of expenditures. Prices are set based on a complex formula that uses historical average cost and average charge data, and makes numerous adjustments for special factors, such as teaching status. For Part B services, the customary, prevailing, and reasonable (CPR) pricing system for physician services is the dominant methodology. It is also a complex system that relies on the historical distribution of charges in a local area to establish allowable payments for thousands of services.

Both the PPS and CPR methods use a variety of types and sources of information. For example, both involve some statistical analysis of historical charges, and both also use local area wage information to make adjustments. The setting of the annual update factor for PPS involves a review of hospital accounting information to estimate how fast hospital costs have grown. The CPR system has been adjusted ad hoc numerous times based on special individual studies or other sources of information.

In this section, we discuss six different methodological approaches to pricing technologies. But, as is illustrated under PPS and CPR pricing, these methods are not mutually exclusive and can be used in many different combinations. The six methodologies are:

- 1) Accounting Report Analysis
- 2) Microcosting
- 3) Statistical Cost Analysis
- 4) Competitive Bidding
- 5) Negotiation
- 6) Expert Panels

The first three methods are overlapping in that they all use accounting information on organizational costs. But what we call "Accounting Report Analysis" would rely almost exclusively on the information from administrative accounting reports such as the Medicare Cost Reports that HCFA requires of participating hospitals. Microcosting differs from this in that it would typically involve some actual observation of the production process to ensure that the costs of all relevant inputs are considered. Statistical cost analysis, as we use the term here, emphasizes the use of econometric methods to estimate economic costs rather than accounting costs.

The second three methods differ from the three cost methods in two ways. First, the process itself is an important element of competitive bidding, negotiation, and expert panels. And, second, by not focusing on cost, the methods have more potential to consider the value of services to medical consumers.

In this section, we also attempt to identify the types of technologies for which each of these methods would be most appropriate.

2.2 ACCOUNTING REPORT ANALYSIS

2.2.1 Overview of Methodology

Accounting report analysis, as defined here, is the use of standard accounting reports, such as Medicare Cost Reports, to determine reimbursement or to set reimbursement levels for particular types of services. For example, under its former retrospective, cost-based hospital reimbursement system, Medicare used such reports to establish reimbursable costs at the individual facility level. Under PPS, these reports are still used, but as part of a statistical analysis of costs to assist in setting the overall rate of increase of reimbursement. Another example is home health services, where the per visit reimbursement is determined by the lower of the cost based on each agency's submitted annual cost reports or cost limits based on 1983 Medicare cost report data. Also, retrospective determination of the facility-specific rates for SNFs is also based on annual Medicare cost report data.

These types of reports are aimed at documenting costs for services provided to Medicare beneficiaries and generally follow standard cost accounting methods in allocating costs to specific activities or departments. Cost accounting recognizes three major categories as inputs into the health care production process--capital, labor, and land. The costs of these resources are attributed to a given product or department by the cost accounting process. Since health care providers are usually complex, multi-product firms, the attribution of costs to specific activities is not a simple exercise. As a result, the information available in these types of accounting reports is limited--better for some products than others.

To understand the limitations of these kinds of reports, it is useful to review how cost accounting information can be used

to determine product costs (see Young, 1984, for further detail). The first step of this process is to identify the technology or service for which the production costs are to be measured. The product in a health care setting might be fairly general like a physician office visit or instead it might be more complex like the costs associated with a hospital-based surgical procedure. Generally, the more specific the product, the more complex the cost accounting methodology becomes.

The next step in the cost accounting process is to determine the different cost centers associated with the production of the given service or technology. There are generally two different types of cost centers--revenue-producing centers or service-producing centers. Revenue-producing centers are reimbursed for providing procedures while service centers are not directly reimbursed. The costs specific to the revenue-producing center are direct costs. The service center costs are generally treated as indirect costs because they are attributable to outputs of many different cost centers.

The total cost of a revenue center is determined by measuring its direct costs and then allocating the indirect costs of service centers to the related cost centers. Each indirect cost is assigned an allocation base which serves as an index for dividing the indirect costs among the other cost centers. For example, housekeeping costs may be allocated according to the amount of square footage. A common method for allocating the indirect costs to a resource center is the "stepdown method." The basic principle of this method is to allocate the indirect costs in a sequential order from the more general to the most specific costs. The indirect cost of a service which cuts across the majority of cost centers is allocated first. The allocation process follows a descending assignment until all indirect costs have been ascribed to the given resource center.

2.2.2 Advantages and Disadvantages of Accounting Report Analysis

The cost accounting mechanism used in accounting reports is likely to be an imprecise method to price individual technologies. The way in which indirect costs are assigned is often arbitrary and variable since the bases of allocation and the stepdown sequence involve some provider discretion. Some methods of allocation are more precise than others yet require the extensive compilation of data. The varying degrees of precision of allocating indirect costs may lead to a mis-estimation of the inputs utilized and inaccurate prices. Because of the flexibility in allocating costs, providers may also "game" the system to increase costs in order to maximize reimbursement.

A second problem with using cost report information in setting prices is that it is based on costs in a particular market for a particular period of time. If direct and indirect costs vary across geographic areas and/or over longer time periods, the resulting average costs may not be representative. In order for cost accounting to effectively measure the technology costs, the production process should exhibit some consistency and stability.

Frequently, the cost accounting method is used to determine the full costs of a given department within a hospital or stand-alone agency. This method, however, may only effectively price a procedure when it constitutes the bulk of the service provided in a given revenue center. When multiple procedures are performed in a given revenue center, then the appropriate prices of individual procedures may be difficult to obtain. Therefore, this pricing methodology will often lack the specificity needed to determine the costs of individual technologies.

Despite its limitations, any pricing methodology which is cost based may be a more appropriate pricing mechanism than a system which bases reimbursement on customary and prevailing charges. Cost-based reimbursement does not create the same incentive for price inflation since the provider is less able to manipulate input prices. Under this type of reimbursement, HCFA would assume more control over the pricing of technologies.

The mechanism of cost accounting is also less expensive than other techniques. It is an easy mechanism to implement from both the providers' and HCFA's standpoint since organizations routinely prepare accounting reports. The finance department of a hospital or another health care agency is knowledgeable about the labor, rental, and equipment costs and may obtain its costs directly from their general ledger. HCFA can obtain costs from the Medicare cost reports and use these costs as a basis for the cost accounting analysis. Other pricing mechanisms such as the relative value scale and microcosting frequently require external personnel to measure these costs. These methods of obtaining technology costs may be quite time consuming as well as expensive to administer.

2.2.3 Potential Uses of Accounting Report Analysis for Pricing Technologies

The feasibility of using accounting report information to determine prices varies according to the practice setting in which the procedure or service is offered. Practice settings which have multiple cost centers like hospital inpatient departments, skilled nursing facilities, and hospital outpatient departments may find cost accounting helpful to determine actual costs. Physician offices and home health agencies which have very few cost centers might find this methodology cumbersome and too detailed for the pricing of services which are offered. In practice settings where the financial records are not

computerized, cost accounting is apt to be more difficult, time-consuming, and expensive.

Using cost report information to price technologies may be most appropriate when the inputs of production are homogeneous across similar treatment settings. For example, cost accounting may be most suited to obtain the costs associated with PPS-excluded hospitals or hospice care where the treatment and procedures do not vary greatly. In these cases, there is not likely to be much variability in costs because the inputs of the production process are essentially the same across facilities.

In terms of pricing technologies, accounting report analysis is likely to be more accurate, other things equal, when the direct costs are a high proportion of the total costs of producing services using the technology. This is because, as indicated above, the allocation of indirect costs often involves considerable arbitrariness. Capital costs may be a particularly good example of this if they are allocated on a square footage basis and no adjustments are made for specialized equipment. Furthermore, determining the true economic costs of capital is further complicated by its complex treatment under tax law. Economic depreciation and depreciation for tax purposes generally differ. For technologies with significant capital costs in the form of specialized equipment, a more direct, microcosting approach, as described below, will probably provide a better measure of economic costs.

In summary, then, several conditions are likely to be necessary for accounting report analysis to yield a good estimate of costs for a given technology. First, the technology and its product should be the principal output of an identified cost center. This permits better estimation of the direct costs because they are separable and identifiable. Second, the volume of output should be measurable. Third, the direct costs should

be a high proportion of total costs since otherwise the arbitrariness of indirect cost allocation leads to imprecision. Lastly, the production process should not vary greatly across facilities or over time if the cost estimates are to provide a reliable basis for setting prices.

2.3 MICROCOSTING

2.3.1 Overview of Methodology

Microcosting also measures the production cost of a given product but involves more direct observation of the production process (Wagner, 1983). Thus, the major distinction between microcosting and accounting report analysis is the level of analysis at which costs are measured. In fact, some cost accounting information is usually used in microcosting. The microcosting methodology, as the name implies, determines costs at the micro or at the unit level. This methodology is much better suited to determining the costs of specific technologies. Typically, microcosting is used in settings which produce many different products but which are similar inputs in the production process.

Direct observational measurements of the inputs and outputs of the production process are the major component of the microcosting studies. One step of the process involves time sampling, which involves a continuous measurement of the time it takes a group of employees to produce a given product. Another technique often utilized is work sampling. This technique involves the periodic observation of workers at a particular time of the day to determine the amount of productive and idle times.

The direct unit labor costs associated with the given tasks are determined by the time it takes to complete a task and the wages of those involved in completing the task. Microcosting

also measures the utilization of the supplies that are associated with the given procedure so that direct costs may be appropriately assigned to the procedure. Indirect costs are allocated according to their relative contribution to the production process using the same methodology as cost accounting. Microcosting recognizes that a certain amount of idle time is a necessary part of the production process and factors these costs into the total costs of a procedure.

2.3.1 Advantages and Disadvantages of Microcosting

When the inputs are measured correctly, microcosting is likely to come closer than cost accounting to measuring the economic costs of a product from the organization's perspective. Microcosting attempts to measure all of the product's preparation costs including handling and storage costs along with the direct labor and supervisory costs. Both work and time sampling by their direct measurement of tasks involved in the production process make it possible to better measure all of the associated inputs and outputs of production. This method may, therefore, provide a better estimate of true economic costs over the other costing methods since it more carefully measures these more subtle aspects of costs.

The direct observational measurements employed in microcosting also make it possible to determine how changes in volume affect the cost of a procedure. This type of methodology, by allowing for comparison in volume changes, permits estimation of the marginal costs associated with a given procedure.

The way in which indirect costs are treated in microcosting is similar to that in the full cost accounting process. Indirect costs are assigned according to some allocation basis. Attributed costs may be manipulated by altering this base. Thus, as with cost accounting, there exists the potential to game the

system. However, the likelihood of manipulating costs is far less for microcosting than cost accounting because microcosting, by directly measuring many of the inputs of production, can reduce the number and amount of indirect costs which need to be allocated.

The microcosting technique is an appropriate way to measure the costs associated with a given technology because of its specificity in measuring the labor costs and the direct costs of supplies and equipment. It, therefore, may be useful in assigning prices to new technologies which are much different from existing technologies.

If the input costs measured by microcosting are subject to much variability, this may limit the usefulness of this methodology. Administratively, microcosting would be difficult to implement on a national or regional basis if there is great geographic variability in the input mix and costs of given procedures. Adjustments to this accounting method would have to be made for variables outside of the provider's control which may directly increase the production costs. For example, rural health care providers might operate at a low capacity and have costs which are much higher than their urban counterparts.

Another source of input variation may be related to the age of the technology. Technology costs measured at an early stage of development might be high. The inputs associated with a given technology are also likely to change over time. If no pricing adjustment occurs, then there might exist a difference between the price of the procedure and its actual costs over time.

Although it is feasible to conduct more frequent microcosting studies, because of the primary data collection requirements, it can be a very expensive and time-consuming method. Current estimates of the cost of a microcosting job may

be \$200-\$500 thousand for one major procedure alone (Wagner, 1983). Therefore, adopting a continual repricing mechanism using microcosting may be appropriate for only the most expensive Medicare procedures.

The reliability of the microcosting approach is dependent on whether the inputs are measured correctly. It may be easy to overlook an input and not measure it. For example, the supervisory costs associated with a given procedure might be overlooked because they are not observed when one is conducting work sampling or time sampling techniques.

As a basis for pricing, microcosting may be seen as more objective than either expert panels and relative value scales, which involve some degree of provider opinion. Thus, this pricing methodology would be less influenced by professional biases.

2.3.2 Potential Uses of the Microcosting Analysis for Pricing Technologies

Microcosting is particularly well suited for settings which produce many different outputs and use similar inputs of staffing, equipment and other resources. This approach can identify the cost of multiple technologies for a given market at a point in time. In this case, the cost of many different procedures which are performed in a given department may be determined by one microcosting study. Thus, this approach could be used to determine the different procedure costs associated with laboratory, radiology, or outpatient departments. Or, microcosting might be used to determine the costs of new drug therapies since this methodology could accurately measure all of the input costs including the storage and preparation costs of these new agents. It might also be particularly appropriate for measuring the costs for newly emerging technologies where no cost history or market prices are obtainable.

In using microcosting, it would be important to not promote the pricing of individual technologies in a way that would further fragment Medicare reimbursement. Providers may have the incentive to unbundle services if the entire technology is not considered as a package mechanism.

2.4 STATISTICAL COST ANALYSIS

2.4.1 Overview of Methodology

Statistical cost analysis is a method of determining prices that involves econometric estimation of statistical cost functions to examine how costs vary with output under efficient production. With this method, a measure of total cost is regressed on measures of outputs, prices of inputs, and other factors that influence costs. In this type of equation, the marginal impact of a change in output on total costs can be examined and level of output at minimum average cost can be estimated.

Statistical cost analysis is commonly used to examine total provider costs rather than costs for specific procedures or services. For example, most statistical cost functions have been estimated at the hospital level. However, it would be possible to use statistical cost analysis to study the costs of various procedures. Total costs in a department or hospital, as the dependent variable, could be regressed on the volume of various procedures, serving as independent variables in the equation. Total inpatient hospital costs could also be regressed on the measured accounting costs of all the DRGs at the aggregate hospital level. Then the effect of a change in the volume of one DRG on average costs can be determined. By holding constant the volumes of all the other procedures, the marginal cost of one procedure can be determined. This method may be limited to the

extent that the costs associated with the independent variables (i.e., the procedures) are not independent. Also, if the number of outputs (DRGs) is large, the degrees of freedom may be small.

2.4.2 Advantages and Disadvantages of Statistical Cost Analysis

A statistical cost analysis approach has several advantages for pricing services. It is a systematic way of determining prices, and it can be based on a large number of observations and the experiences of many providers. Also, statistical cost analysis can adjust and control for numerous factors affecting prices. As these factors change, their effects on prices can be taken into account.

As a method for pricing technologies, there are several major drawbacks to statistical cost analysis. Detailed data must be collected for the analysis. But, even so, such data are usually aggregate costs rather than the costs of individual procedures or technologies. Much of these data will be information on costs or charges of inputs. If charge data are used, the results of the analysis may be biased if charges of inputs do not reflect their costs. Obtaining cost data may require the use of cost accounting or microcosting to determine costs for some of the independent variables in the cost function, or the use of cost-to-charge ratios if the Medicare population is to be separated. In order to obtain certain data for statistical cost analysis, surveys, interviews, time and motion studies, and task analyses may have to be conducted (Bovbjerg et al., 1987).

Thus, statistical cost analysis requires considerable technical expertise and extensive data collection. Furthermore, the complexity of the analysis increases rapidly with a large number of technologies and procedures (Urban Institute, 1983). Statistical cost analysis is often used to determine total hospital costs, costs per discharge, costs per patient day, and

costs at similarly higher levels of aggregation since this type of analysis is less complex than a statistical cost analysis of a specific technology or procedure. For example, Grannemann et al. (1986) employed statistical cost analysis to make estimates of the marginal and average incremental costs for inpatient and outpatient care.

2.4.3 Potential Uses of Statistical Cost Analysis for Pricing Technologies

It is unlikely that statistical cost analysis would be employed to price new technologies because of the data limitations due to lack of a sufficient number of observations. However, statistical cost analysis could be used to reprice established procedures and technologies. High cost and high volume procedures are probably the most likely candidates for statistical cost analysis since they are likely to provide a sufficient number of observations and the potential cost savings may be higher. In addition, since statistical cost analyses can become quite complicated with a service type in which a large number of procedures are provided (e.g., physician services), it is more feasible for types of services where facilities provide a small set of homogeneous procedures such as ESRD or home health services.

2.5 COMPETITIVE BIDDING

2.5.1 Overview of Methodology

Another potential approach to determine prices for technologies is competitive bidding. Unlike cost accounting, microcosting, and statistical cost analysis, competitive bidding does not necessarily involve the use of cost data to determine prices. In addition, competitive bidding is more than just a

pricing mechanism, it can also be used to select providers of services.

The competitive bidding process can take a number of forms. Competitive bidding programs differ by the unit of service, selection of winning bidders, reimbursement methods for winners, and treatment of losers. Services must be clearly defined in order to assure the comparability of bids. In the past, the level of aggregation of services for bidding has commonly been for all health services at a capitated rate, for episodes of illness, or for types of services such as physician services. For pricing technologies, competitive bidding could be useful on a per procedure or individual unit of service basis, or for a set of such procedures or services. Bidding can be open to all providers or limited to specific providers. If bidding is limited to certain providers, some quality and/or volume criteria usually have to be met in order to submit a bid. A large number of bidders in competition with one another increases the likelihood that bids will reflect prices that would result if the market were competitive. There should be no collusion among bidders. Furthermore, to the extent that gaming occurs (i.e., purposely bidding lower than costs in order to gain volume from other providers or submitting bids at higher than cost in anticipation that prices will be forced down), prices reached through the competitive bidding process may not reflect a competitive market price. If there is only one bidder, it is common to use a negotiated bid procedure which combines competitive bidding with negotiation.

In the case of multiple bidders, there are two main bidding approaches (Christianson, 1984) used: the sealed bid auction and the ascending Dutch auction. In a sealed bid auction, the payor does not suggest a reasonable initial bidding price and accepts sealed bids from providers. Thus, providers do not know what their competitors are bidding. In the ascending Dutch auction

method, the payor announces a price and then invites qualified providers to participate at that price. If there are not enough providers to handle the expected volume, the payor can increase the initial price until the desired capacity is reached. This method reveals information about the providers' supply curves. Reimbursement through the competitive bidding process can be competitive or discriminative. Discriminative reimbursement means that bidders are paid according to their bids. Presumably, after quality and volume are considered, the lower cost bidders win. Competitive reimbursement means that all winning providers are paid the same amount. This is usually the level of the highest winning bid or the lowest excluded bid or some average of the bids. Both the bidding approach and the method of reimbursement influence the bidding strategies, and therefore the extent to which bidders reveal true costs. Paying winners at the rate of the highest winning bid or the lowest excluded bid encourages the profit-maximizing bidder to submit bids equal to estimated costs. Submitting bids higher than costs increases the risk of not being selected and does not increase reimbursement (Christianson, 1984). In addition, this reimbursement mechanism should encourage lower bids in the future.

2.5.2 Advantages and Disadvantages of Competitive Bidding

There are several advantages to using competitive bidding as a pricing mechanism. It allows the purchaser to achieve a price close to efficient costs of production without requiring that the purchaser have any information on costs. However, this is only true if there are a large number of bidders who are truly in competition. In the long run, it can encourage cost-effectiveness among providers and restrain increases in fees and charges. In the short term, competitive bidding can achieve large adjustments in prices that may not be attainable using other pricing mechanisms.

Competitive bidding may become complicated when more than one service or procedure is being bid upon. Furthermore, over time competitive bidding may increase winning bidders' market power enough that the market is no longer competitive and evolves into an oligopolistic or monopolistic market, and potentially restricting access. If competitive bidding is used to select providers as well as determine prices, access to care may become a problem. Also, in selecting the lowest bidders or reimbursing at the lowest bid may compromise the quality of care. This is particularly a concern if providers underbid in order to gain volume.

Competitive bidding has been used to set prices in a number of cases. Several state Medicaid programs have experimented with competitive bidding for the provision of durable medical equipment (DME), drugs, home health agency (HHA) services, eyeglasses, hearing aids, laboratory services, x-ray services, and oxygen. The primary examples of competitive bidding for Medicaid services have been in California, Arizona, and Illinois.

The approach taken by MediCal (California's Medicaid program) was a mixture of competitive bidding and negotiation. Prior to requesting bids in 1982, MediCal set a target negotiation rate of the 1981 per diem rate minus 10% (Ensign and Mayerhofer, 1983). Hospitals submitted bids on per diem rates for inpatient hospital services for MediCal patients. A chief negotiator designated by MediCal then contacted each hospital and told them to lower their bids by \$50 and MediCal would sign contracts. Thus, this competitive bidding exercise resembled individual contract negotiations after the initial round of bids. While this exercise may be useful in the short term in lowering reimbursement, in the long term if providers anticipate being forced to lower their bids, they may bid artificially high initially and may not reflect costs. In the MediCal competitive bidding process, there has been concern about quality of care and

access to care although little evidence points to a deterioration (Christianson, 1984).

The Arizona competitive bidding program for indigent care involved separate capitated bidding for inpatient hospital, outpatient hospital, pharmacy, laboratory, x-ray, and related diagnostic medical services. Arizona had a reservation price based on its budget and expectations of provider costs. Bidders set quantity limits as well as submitted price bids. After a round of rebidding to lower bids which the state felt were too high, providers were paid their reduced bids (Bovbjerg, 1987).

Medicare has attempted to implement or has proposed competitive bidding for clinical lab services, DME rentals and purchases, ESRD services, and HHA services. In the early 1980s Congress authorized a competitive bidding demonstration for clinical laboratory services. One version of the demonstration was to have open bidding in which labs submitted one price which would then be used as the conversion factor for a relative value scale to determine prices of different lab tests. In the home health care channeling demonstration project, competitive bidding for the categories of HHA services was used to choose the providers for home health care. Winners were reimbursed based on bid prices. In 1985, kidney dialysis units were asked to competitively bid per session rates for dialysis services. If bids were lower than the prevailing rates, patients were to share in the cost savings. However, the demonstration never got underway since there was only one bidder and the concept faced opposition from ESRD facilities and nephrologists (Bovbjerg, 1987). Thus, in general, although competitive bidding has received much attention, there have been some difficulties in implementation.

More recent examples of competitive bidding are the current Medicare PPO and coronary artery bypass graft (CABG) demonstration projects. These projects appear to have captured the interest of a large number of providers. Medicare has selected PPO organizations to accept discounts in Medicare physician payments based on winning bids selected in a competitive bidding process. HCFA is in the process of selecting sites that will accept a global payment (for hospital and physician services) for the provision of CABG surgery. This is a rare example of using competitive bidding for determining the price of a specific procedure.

2.5.3 Potential Uses of Competitive Bidding for Pricing Technologies

Theoretically, competitive bidding appears to be most advantageous for high volume/high cost procedures (greater potential savings, greater number of bidders). Competitive bidding also appears to be most useful when services or items are relatively standardized and easily defined. This assures comparability of bids. Furthermore, if competitive bidding is used as a means of selecting providers as well as determining prices, it is best used for technologies or procedures in which quality is easily determined and can be specified in advance, there are many providers, procedures in which Medicare and other public programs are major payers, and where access will not be a problem (Bovbjerg, 1987). For example, lab services would fit all these criteria. Quality of lab services is measurable in terms of accuracy rates. There are many vendors of lab services to increase the likelihood of competition. Finally, the location of laboratory services does not provide access to care problems since lab tests can be performed away from the site of care. Additionally, competitive bidding may be more appropriate for procedures which are noncritical or elective in nature. For these procedures, a decrease in access is less critical since

patients will have more time and ability to receive care from providers.

The major disadvantage of using competitive bidding solely as a pricing mechanism is that it may not work in the long term unless it is also used as a mechanism to select providers. If used as a pricing mechanism alone, bidders are likely to learn to game the system over time, eliminating the relationship to costs. On the other hand, selective contracting would reduce the number of providers, thereby restricting access to care. Furthermore, there is potential to game the system, by taking short-run losses in the hope of long-term volume gains.

2.6 NEGOTIATION

2.6.1 Overview of Methodology

Another methodology for determining prices that does not necessarily rely on cost data is negotiation. The use of negotiation to determine prices of technology would involve the meeting of representatives of the payers and representatives of the various providers of health care services. The negotiation process can take many forms. For example, the federal government, through HCFA, can negotiate directly with provider representatives at the national level, or it can delegate responsibility for negotiations to carriers who negotiate prices with local provider representatives. Either of these situations represents a bilateral monopoly in which both sides control production and payment for health care services. Negotiations can be made on an individual basis with each provider, or, if on a larger scale, would most likely be made with chosen representatives of groups of providers through collective bargaining. Negotiations can also be subject to binding or nonbinding arbitration through mediators.

Negotiation differs from competitive bidding in that with competitive bidding, providers generally submit bids and payers select bidders or determine the price level based on this information. With negotiation, in effect, both sides submit bids and then both sides are involved in the decision process as they come to a mutual agreement. While negotiation differs from competitive bidding, it can be used in conjunction with competitive bidding. For example, the Arizona Medicaid and California MediCal programs, described above, utilized a combination of the two methods to set prices for health services.

The degree to which negotiated prices reflect costs is unclear. The prices ultimately negotiated reflect many factors: the actual costs of the providers, the payers' perceptions of these costs, the payers' willingness to pay, the providers' perception of this willingness, and the relative bargaining power of the two groups. If the negotiating process is dominated by the first two factors, actual and perceived costs and willingness to pay, prices should be close to what would have occurred in a competitive market. If relative bargaining power is relatively unequal or otherwise influences the negotiation process, agreed-upon prices may not resemble those that would have occurred in a competitive market. If providers are in the strong position, the prices are likely to be higher than expected. Conversely, if payers have the stronger position, the prices may be lower than expected. Other factors such as access to care may be factored into the negotiation process by the payers' willingness to accept a higher price in order to assure access. The inability to reach an agreement means that both sides lose. The providers lose in terms of exclusion from providing services and payers lose in terms of reduced access.

2.6.2 Advantages and Disadvantages of Negotiation

Using negotiation as a pricing methodology has the advantage of not requiring data on the costs of a procedure or technology. However, while the collection of cost data is not necessary, knowledge of costs strengthens the negotiating position of either side. Another advantage of this pricing method is that it could promote market efficiency. Disadvantages of this methodology are a risk of adversely affecting access if negotiated prices are too low due to excessive bargaining power on the part of the payers. Conversely, if the providers' negotiating position is too strong, prices may be too high. There is also a risk of violating antitrust laws if it appears that price setting is occurring among independent providers.

2.6.3 Potential Uses of Negotiation For Pricing Technologies

Negotiation to set prices for health services is common in several countries. In Canada, the provincial governments enter into the bargaining process with provincial medical associations in order to determine updates in fee schedules for health services. Physicians in West Germany also negotiate fee schedules with the government.

In the United States, negotiation is often used when setting HMO capitation rates and in PPOs when determining fee schedules. An example of negotiation is Caterpillar Corporation's negotiation with local surgeons for a fee schedule based on a degree of difficulty relative value scale (Cohen et al., 1985). Caterpillar negotiated global fees on a local level by convening meetings between representatives of the surgeons in the community and Caterpillar's medical director for group insurance to determine the degree of difficulty for various surgical procedures. The RVS served as a reimbursement cap. Physicians

indicated their willingness to perform a specific surgery at a given price.

While it is feasible to negotiate prices for any type of procedure or service, since administrative costs of negotiating prices are likely to be relatively high, it is likely that only technologies and procedures with potentially high cost savings would be subject to negotiation.

2.7 EXPERT PANELS

2.7.1 Overview of Methodology

Expert panel decisions are an alternative means of determining the cost of a given technology or procedure. Expert panel judgments are most useful when no precise data about a technology are available. In this instance, the panel relies on its opinions to arrive at a decision. In the past, structured group methods have been utilized by the National Institutes of Health to determine appropriate clinical patterns and the benefits of existing technology. Although this methodology has never been formally utilized to arrive at prices of procedures, there is no reason it could not be adopted for this purpose.

There are three main structured methods of conducting expert panels. These are: 1) consensus development; 2) the Delphi technique; and 3) the nominal group technique (Berenson, 1983). Each relies on comments from the outside audience before reaching a decision.

The consensus development technique requires the face-to-face interaction of 10 to 20 experts. The process of consensus development is formalized. Individuals first listen to the presentations from clinicians and others knowledgeable about a technology or procedure. Comments from the outside audience are

then invited before the panel convenes alone to reach a decision. The panel strives to reach a full consensus. After reaching a preliminary decision, the panel presents its findings to the public for further comment. After this second round of public opinion is obtained, the panel reconvenes to arrive at its final conclusion.

Unlike the consensus development technique, the Delphi decision-making technique is administered anonymously. Consensus is achieved through successive rounds of questionnaires, each relying on and narrowing the range of disagreement in information given by experts. The experts' responses from previous rounds are used to formulate more precise questions for the subsequent rounds. The experts are also provided with feedback from the prior questionnaires in order to help them make more accurate estimations.

Nominal group technique is a hybrid of the consensus development and the Delphi techniques. Like consensus development, the experts do have face-to-face interaction with each other. The individual's responses are, however, anonymously recorded as with the Delphi technique. The panelists meet together and are asked to anonymously write their responses to given questions posed by the narrator of the group. The panelist responses are then aggregated for the panelists to review. Successive rounds, as in the Delphi technique, enable individuals to further refine their estimations.

2.7.2 Advantages and Disadvantages of Expert Panels

Each of these expert group techniques have varying degrees of effectiveness at arriving at a given outcome. Delphi has been found to be more effective when the data about the subject are minimal and the outcome is highly controversial (Urban Institute, 1983). The Delphi technique, however, relies on fairly precise

instructions with finite options. Consensus development, on the other hand, encourages a continual modification of the outcome as panelists interact. The chance of an individual swaying the opinion of the other panelists is more likely for consensus development than the other two expert panel techniques.

All three techniques attempt to define an outcome based on experts' prior knowledge and interpretation of existing data. In some instances, when there are no quantitative data available, the experts may have to rely heavily on their experience. If these panelists are being required to reach a decision that is not within their expertise, it is likely that errors will be made and prices will not approach what would have resulted in a competitive market.

When there exists considerable uncertainty in reaching a decision, the expert is apt to be influenced by the other panelists in reaching his or her conclusions. In these instances, outcomes are likely to be biased or based on the judgments of a few individuals and may not reflect true costs or value of the technology. Although an outcome is arrived at, the validity of this outcome may be questioned. The influence of other panelists is minimized by the Delphi or nominal group techniques while consensus development is most subject to this bias.

Expert panel methods may be more appropriately utilized to reprice procedures rather than to establish the prices of new procedures. The usefulness of assembling a panel of experts to price new procedures is limited because of the initial practice pattern and cost variations associated with the introduction of a new procedure. Panelists are likely to have difficulties pricing new procedures because there is likely to be limited cost and utilization data to refer to.

The derivation of expert panel judgments can be quite time consuming because the final decision is a product of a group decision-making process. It is difficult to reach a unanimous decision immediately. Many factors influence the time required to reach a decision including the panelists' knowledge base and the panel size. Although the larger group size may yield more reliable information, the process of obtaining this information may be more cumbersome given a group size of twenty versus ten.

Even though this approach is time consuming, it certainly can be less expensive and easier to implement than other methodologies. Also, unlike some other approaches, the costs of technology can be estimated even without solid data. If the panelists are clinicians who have actual experience with a given technology, they would be able to estimate the time, skill, and complexity of a given procedure. These estimations can be used as a starting point to guide HCFA in determining the cost of a given procedure or technology.

2.7.3 Potential Uses of the Expert Panel Methodology for Pricing Technologies

Although there are limitations in the ability of the panel to appropriately price new technology, this method may be used to estimate appropriate prices of established technologies. An expert panel, for example, could be convened to reprice certain overpriced procedures. However, if certain panelists have a vested interest in a given procedure, they might overestimate the costs of these procedures. Expert panelist decisions might therefore be most useful in estimating the costs of procedures in which the experts are aware of but for which the expert is not directly reimbursed for these procedures.

SECTION 3
CRITERIA FOR IDENTIFYING TECHNOLOGIES FOR REPRICING

3.1 HCFA'S ROLE IN IDENTIFYING PRICING PROBLEMS

Our previous examination (Garrison, Wojcik, and McLaughlin, 1989) of the pricing process for various technologies under Medicare found that pricing decisions are usually made in a decentralized fashion and on an ad hoc basis. HCFA generally does not conduct analyses that review the prices and resource costs of Medicare technologies over time.

Many of the HCFA's decisions to reprice Medicare technologies have been based on studies conducted by other agencies. The OIG, PPRC, and PropAC have all investigated the prices of new and existing technologies. The decision to reprice the physician component of overpriced procedures was Congressionally mandated after PPRC conducted a study comparing the resource use and physician charges of 36 overpriced procedures. PPRC is also actively working on the possibility of implementing a relative value scale for physician services. The OIG study on intraocular lens costs prompted HCFA to consider establishing a flat payment rate for intraocular lens procedures. In these cases, HCFA responded to the studies directed by these other agencies rather than initiating studies to reprice technologies.

The few decisions to reprice technologies which were initiated by HCFA have been made on an ad hoc basis. For example, HCFA made the decision to reprice automated lab procedures after HCFA's Bureau of Quality Control collected cost information on clinical lab procedures. The decision to reprice these technologies was an indirect consequence of another study done by HCFA.

In some ways, HCFA's pricing and repricing process resembles its approach to coverage decisions. HCFA primarily uses information from outside sources to reach both coverage and reimbursement decisions regarding new technology. And older technologies are seldom re-examined with regard to coverage or price. (Of course, an important exception to this is Medicare's PPS which automatically reprices some components of inpatient technologies relying on HCFA-generated data.) These similarities arise in part due to the difficulty of evaluating technologies. No doubt, the limited resources of HCFA are a major factor inhibiting the evaluation and monitoring of technologies. Indeed, given their resource constraints, an ad hoc approach that relies on the findings of other organizations may be the best way of identifying problems regarding the pricing and coverage of technologies.

There is, however, at least one significant difference between HCFA's process for making coverage decisions and that for making pricing decisions. As described in our first background paper, Medicare contractors (intermediaries and carriers) forward coverage questions to the regional offices, and they may eventually be brought to the attention to an internal HCFA physician panel at headquarters that advises whether a national-level coverage determination should be made. As far as we know, there is no analogous process for pricing questions, though certainly HCFA headquarters receives complaints from beneficiaries, providers, or contractors regarding pricing on some items.

The primary purpose here is not, however, to fully develop or analyze such a process with regard to pricing although some of our findings should be relevant to such an investigation. Without specifying such an administrative process, suffice it to say that, we believe, the costs of identifying technologies for which repricing may be beneficial are not exorbitant or

prohibitive. In work we have done for ProPAC, it has not been difficult to identify a manageable set of important new technologies affecting the Medicare population. The number of distinctly new drugs, procedures, and equipment that emerge each year is not large and only a small subset of them are likely to have a major immediate cost impact. In addition, with regard to older technologies, there is every reason to believe that a process for registering complaints, perhaps coupled with surveys of providers, could provide an effective mechanism for identifying those older technologies that are mispriced.

The Secretary has the authority to identify such pricing problems and make adjustments. Section 4526 of OBRA specifies guidelines for the Secretary to use in making pricing adjustments. The Secretary, under "inherent reasonableness authority", can make price adjustments for certain procedures if:

- 1) the prevailing charge for a service in a particular area is significantly greater or less than the prevailing charges for the same service in another service areas,
- 2) Medicare and Medicaid are the sole or primary payers for the service,
- 3) the market place is not competitive,
- 4) charges have increased beyond that which can be explained by inflation,
- 5) charges do not reflect changes in use, efficiency, or the cost of technology, or
- 6) the prevailing charges for a service are substantially higher or lower than payments for the same service by payers in the same locality.

The six pricing methods discussed in Section 2 were aimed either at determining costs or at simulating an outcome of a more competitive marketplace. Thus, they pertain more to items 3, 4, and 5 on the above list. The other items serve more as criteria for identifying pricing problems than as pricing methods per se,

although prices can be, and have been, based on average charges. Whether the Secretary and HCFA should begin to exercise this authority more frequently in the case of mispriced specific technologies depends partly on the costs of developing a more appropriate price, which were discussed for the methodologies in Section 2.

In general, an ad hoc approach can be most effective in making pricing adjustments if it focuses on areas of high Medicare expenditures. Physician services, which constitute the bulk of Medicare Part B expenditures, have been and continue to be evaluated by the PPRC. Reimbursement adjustments for the physician component of many overpriced procedures have already been implemented based on the PPRC's recommendations. Relative value scales for radiologists and pathologists have also been recently instituted. However, without some uniform criteria, applied systematically, an ad hoc approach runs the risk of missing important instances of mispricing. In the next subsection, we identify and define a set of criteria that could be used.

3.2 GENERAL CRITERIA FOR SELECTING TECHNOLOGIES FOR PRICING

Because of the large number and variety of procedures performed on Medicare beneficiaries, as well as the high administrative costs of conducting a review of all procedures for appropriate pricing using the pricing methods described in Section 2, it is useful to establish criteria for choosing procedures to review. While the "inherent reasonableness authority" legislation provides specific criteria to determine whether procedures are mispriced, this section lists some more general criteria for initially identifying technologies for a pricing review suggested in the "inherent reasonableness authority" legislation.

Just as a competitive market exhibits certain patterns (prices tend toward equilibrium, etc.), noncompetitive markets may, through the behavior of the participants, give certain signals revealing which procedures may be mispriced. Though an overpriced procedure may not be readily identifiable, provider behavior or the market for health services may somehow indicate that a procedure is possibly overpriced. HCFA could take advantage of these signals and use them as criteria to identify potentially overpriced technologies and procedures and target them for pricing review. For example, if providers are receiving excess profits from the performance of a certain procedure, the volume of that procedure and the number of providers performing that procedure would be expected to increase over time. Other than these signals, because administrative costs of pricing review are likely to be high, other criteria for review may help to assure that expected cost savings from repricing will outweigh the administrative costs. Some of the major criteria may include the following:

- o High volume procedures
- o High cost procedures
- o Procedures otherwise expected to yield large cost savings
- o Procedures with substantial price variability across providers or locales
- o Procedures with a volume increase above general trends
- o Procedures with a price increase above general trends
- o Procedures for which production patterns (inputs) have changed
- o Procedures incorporating a new technology
- o Procedures for which Medicare is the primary payer
- o Procedures for which the number of providers or suppliers offering has increased significantly

- o Procedures for which Medicare payment is significantly different than that of other payers

Each of these are discussed in turn.

High Volume

HCFA may want to review the most frequently performed procedures for repricing since procedures with high volumes may produce significant Medicare cost savings if they are overpriced, depending on the magnitude of the price change. In addition, procedures currently performed on a high volume basis, may be so partially because they are potentially overpriced, giving providers an incentive to perform them more often than necessary. Some examples of high volume procedures are coronary artery bypass graft surgery, percutaneous transluminal coronary angioplasty, and lens implants.

High Cost

For similar reasons, reviewing procedures with significant costs may potentially yield large cost savings if these procedures are significantly overpriced. For example, magnetic resonance imaging (MRI), positron emission tomography (PET), and single photon emission controlled tomography (SPECT) scans, are high cost procedures as are electrophysiology studies and carotid endarterectomies.

Potentially Large Cost Savings

It is logical that HCFA would want to direct its priorities for repricing to procedures which can potentially result in large cost savings for the Medicare program because of their high cost, high volume, or some other factor. In order to make pricing review cost-effective, it is necessary for potential cost savings

to be large enough to offset the administrative costs of the review.

Substantial Price Variability

If the price of a procedure or technology varies considerably by provider or location, and the variability cannot be readily explained by geographic cost differences or other factors, HCFA may want to review them. If price differences cannot be readily explained, this may be evidence of price discrimination, the market is not competitive, or is functioning inefficiently.

Volume Increase

If a procedure or technology experiences a significant rise (above a reasonable percentage) in volume from one year to the next, it may be a candidate for review. If a procedure increases in volume significantly above what may be expected based on demographic or epidemiologic reasons, this may be a signal that a procedure is overpriced. Physicians may have increased the performance rate of such procedures because of the financial incentives.

Price Increase

Procedures or technologies experiencing a significant increase (above a specific percentage) in average prices may also be candidates for pricing review. This is particularly appropriate if the price increase cannot be explained by a change in the price or quantity of inputs (labor, supplies, overhead, etc.) in the provision of a procedure or by inflation.

Change in Production Patterns

Often as a technology diffuses and providers become more efficient in using it for certain procedures, the prices of the procedures do not adjust to these changes. Prices usually remain at the level set according to previous production patterns. Procedures or technologies for which studies show that the labor intensity, the amount of direct supplies, or some other aspect of practice patterns has changed but the price has not, are procedures which may be considered for repricing. For example, newly automated procedures reduce labor inputs and increase capital inputs. Prices in a competitive market reflect changes in the cost of production among other factors.

New Technology

One of the major reasons for a change in the production process for a procedure is the adoption of a new technology. As described in the first report under this project, it is often true that prices of new technologies are set at initially high rates due to the experience of a few providers in the initial diffusion stages of a technology. At this point along the learning curve, providers may be relatively inefficient users of the technology. Thus, incorporation of a new technology for specific procedures may warrant periodic review of the pricing for those procedures.

Medicare is a Major Payer

If Medicare pays for the majority of cases involving certain procedures or technologies, it may wield greater influence in adjusting the price and it may have increased the likelihood that the procedure is currently overpriced if providers perceived that Medicare was more likely to pay for the services than other payers. Thus, procedures satisfying this criterion may also be

useful to repricing. Intraocular lens implants, cochlear implants, and prostate surgery may be some examples.

Increase in the Number of Providers or Suppliers

If the number of providers performing a specific procedure on Medicare beneficiaries increases dramatically (above a specified rate) for reasons which cannot be explained by a change in policy, demographics, practice patterns, or technology, this procedure may be a candidate for review. It may also be useful to examine if the number of suppliers marketing devices, such as implantable infusion pumps, increase significantly beyond demographic or epidemiologic changes. If a procedure is overpriced, not only do providers have an incentive to increase the volume of the procedure, but also other providers previously not performing the service have an incentive to initiate its provision.

Price Difference by Payer

If Medicare payments for certain procedures or services are significantly different from that of other payers, this may be evidence of price discrimination. Since private payers have increased reimbursement review activities and providers and suppliers may have perceived that private payers are less likely to pay than public payers, services reimbursed by private payers may be significantly less than Medicare payments.

SECTION 4

CONCLUSIONS AND NEXT STEPS

4.1 RATIONALE FOR INTERVENTION

Given that the health care services market does not always meet the competitive ideal, and given the widespread belief and evidence that price distortions exist, HCFA wishes to examine alternative pricing strategies and criteria for identifying situations in which they should be implemented. While there is no guarantee that an administered pricing system will eliminate distortions, the existence of distortions provides HCFA with a rationale for intervening to set prices. The degree to which this intervention is successful depends on: 1) the costs of identifying technologies for which distortions exist; 2) the costs of determining appropriate adjustments; and 3) the benefits of making the adjustment.

HCFA currently makes repricing decisions on an ad hoc basis. Decisions are often made on the basis of studies by other organizations or after studying procedures on which attention has recently focused for some reason. Given the expense of systematic review and formalized organizational mechanisms, and given the probable effectiveness of this approach, this may be the best approach for HCFA to take. However, based on our experience in working with PropAC in identifying new technologies, we believe that it would be possible, at a relatively small cost, to identify technologies with pricing problems through literature reviews and a small telephone survey of experts.

4.2 COSTS OF IDENTIFYING TECHNOLOGIES

Section 3 of this paper addresses point 1--the costs of identifying technologies for which distortions exist--and to a

lesser extent, point 3 above--the benefits of making the adjustment. The discussion identified general criteria to identify technologies for which potential pricing distortions exist and criteria to increase the likelihood that the benefit of an adjustment (i.e., cost savings to Medicare) will be the greatest. Since price distortions create incentives which cause the markets to respond in certain ways, many of the criteria attempt to identify whether such behavior is occurring. If so, the technologies involved are likely candidates for review. These criteria include procedures experiencing one of the following:

- o A significant volume increase
- o A significant price increase
- o Substantial price variability across providers or locales
- o Incorporation of a new technology
- o Changed production patterns
- o A significant increase in the number of providers

By focusing repricing efforts on procedures for which one or more of these factors, the cost of identifying technologies with price distortions should be reduced.

To assure high potential benefits, the following additional criteria should be considered when identifying any technology to be studied for adjustment:

- o High volume
- o High cost
- o Medicare as predominant payer
- o Other reasons to expect large cost savings

Procedure volume and the magnitude of the price distortion are the factors which determine the amount of potential benefit of an adjustment. The actual benefit depends on the volume and the size of the adjustment made. For example, the hospital and physician component of coronary artery bypass graft (CABG) surgery are priced at around \$25,000, making CABG surgery a high cost Medicare procedure. In addition, CABG surgery is also frequently performed on Medicare patients. Thus, successful attempts to reprice CABG surgery are likely to lead to large cost savings for Medicare. If the current price is too high, even a small percentage reduction in price will translate into large dollar savings. In general, the most frequently performed expensive procedures are technologies that will yield the most benefit from repricing if, in fact, price distortions exist.

4.3 COSTS OF PRICING TECHNOLOGIES

Section 2 of this paper addresses point 2 above-- the costs of determining appropriate adjustments. These costs depend on the methodology used to determine prices. Microcosting, statistical cost analysis, and accounting report analysis are aimed at basing price on average production costs. Of the three, microcosting may be the most costly per individual technology since it requires observation and primary data collection. Much of the data for accounting report analysis and, to a lesser extent, statistical cost analysis are currently collected and available, though often of limited use for individual technologies. Competitive bidding, negotiation, and expert panels, to some extent, can be seen as methods aimed at achieving the competitive market outcome, giving some consideration to value and rationing of existing supply as well as long-run production costs. Competitive bidding and negotiation require large administrative costs for the actual bidding and negotiating process. These costs depend on the number of participants and the scope of procedures included, with

a higher number corresponding to higher costs. Pricing by expert panel may be the least costly method since it may require little data, little analysis, and only the time of a handful of experts.

The appropriate pricing methodology depends, in part, on the technology being analyzed. Section 2 described the general classes of technologies that would be well-suited to a particular method. The choice of a methodology will be affected by whether the technology is new or established. New technologies may have little, or rapidly changing, cost data and few observations. Thus, methods depending on cost data would be less likely to be used. However, if the initial implementation of a technology represents well the eventual production process, microcosting would be appropriate, if risky.

Expert panels or negotiation may be most appropriate for pricing new technologies because of the lack of cost data and because the technology may not be diffused enough for successful competitive bidding. Established technologies may be more suited to the methodologies relying on cost data since historical data are available and production and use patterns presumably have stabilized. Microcosting may be best suited for technologies in which the production process is relatively stable and consistent across regions, settings, and provider types. Competitive bidding is well suited to technologies in which the number of providers is large, they are in reasonable competition with one another, and the effect of competitive bidding on access to care is minimal. If the number of providers of a technology are relatively small, negotiation may be the best method of pricing.

4.4 NEXT STEPS

The next steps in this project are (1) to identify specific technologies as candidates for pricing or repricing, (2) assess

whether the benefits from repricing are likely to be large for these technologies, (3) select the most appropriate pricing methodology in each instance, and (4) apply the methodologies as case studies. The first two papers of this project will guide us in performing each of these tasks. Technologies for study will be identified based on consultations with HCFA, our knowledge and past work in analyzing technological innovation in health care, and, to the extent possible, the application of the general criteria listed in this paper.

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